Improving very-short-range Forecasts of the Pre-Convective Environment using operational Geostationary Satellite Observations

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We will briefly describe the development and configuration of the CIMSS Lagrangian NearCasting system and the advantages of the approach for retaining/enhancing the information about the pre-convective environment contained in GOES moisture and temperature soundings. This will be followed by results of forecaster evaluations made during the past several years in conjunction with the GOES-R Proving Grounds at US National Weather Service (NWS) Forecast Offices, and both the Storm Prediction Center (SPC) and the Aviation Weather Center (AWC) divisions of the National Centers for Environmental Prediction (NCEP). Tests of hourly updated 1-9 hours forecasts at the two centers focused both on where/when severe convection **will** occur, as well as ***all*** forms of deep convection **will** *and* **will not** occur. All groups wanted to: a) Increase lead-time, b) Reduce false alarms and increase probability of detection, c) Provide updates / detail to NWP guidance for next several hours, and d) Increase use of satellite products (they currently rely heavily on Numerical Weather Prediction (NWP) models and radar observations). Results showed that the NearCast prediction period could be successfully increased from 6 to 9 hours, that the analysis improved by increasing the number of observations projected forward from previous, that the NearCast wind fields can provide information about low-level triggering mechanisms and storm severity, that the NearCasts enhanced NWP guidance by isolating which forecasts areas were and were not likely to experience convection and when and, very importantly, that successful use of the NearCasting tools requires enhanced forecaster training and education - both about the NearCast system itself and interpreting satellite observations and derived products.

Case studies from several severe weather events from this past year will be highlighted, including events near Branson MO and and western MA, as well as the Ohio Valley Derecho event. Examples of the impact of converting the NearCasting system to isentropic coordinates will also be discussed, including the ability to identify areas where sufficient lower-level lifting will be present to release the predicted convective instability and how severe convective incidents can be separated from less severe, heavy precipitation episodes.

Finally, we will review plans/objectives for further testing at NCEP's Hydrometeorological and Ocean Prediction Centers (HPC and OPC), as well as described tests planned with EUMETSAT in the coming years using SEVIRI data as a surrogate for GOES-R ABI.